November 14, 1997

HCFA Year 2000 Compliance
Project and Testing Guidelines

PURPOSE

The testing effort for HCFA internal systems, external systems, and interfaces will demonstrate adherence to the HCFA Year 2000 Compliance Definition document and ensure that system functionality has not changed.

LEVELS OF TESTING

As a minimum, Year 2000 testing will include the following levels of testing. All testing will verify Year 2000 software modifications and existing functionality.

UNIT = verifies the logic, computations, functionality and error handling of a unit; includes desk checking (visual inspection) of all lines of code, and code walkthroughs of all Year 2000 modifications.

INTEGRATION = verifies the internal integrity of a collection of logically related units (module); verifies the module's external interfaces with other modules, data files, external input and output.

SYSTEM = verifies the full, beginning to end capabilities of the system; verifies that the system is functionally and operationally complete; includes regression testing. System testing must be performed for conditions, test data and a system date in both the 20th and 21st centuries.

ACCEPTANCE = verifies that the system requirements are satisfied, and that the system is functionally and operationally correct from the users' perspective; includes regression testing. Acceptance testing must be performed for conditions, test data, and a system date in both the 20th and 21st centuries.

COMPLIANCE = verifies Year 2000 compliant systems in a fully Year 2000 compliant environment.

METRICS

As a minimum, the following statistical measurements will be required to monitor all Year 2000 projects and testing:

Progress metrics to indicate planned vs. actual Test Case Description development
Progress metrics to indicate planned vs. actual Executed Test Cases

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PROJECT PLAN GUIDELINES - YEAR 2000 MODIFICATION

At a minimum, a comprehensive Project Plan should include the following sections:

1. Introduction

system overview, applicable documents

2. Scope

describe magnitude of Year 2000 project including date intensiveness
identify major system components
discuss data exchange considerations
explain any exceptional processing issues

3. Customer Contact Information

HCFA owner, user (internal systems)
contractor, maintainer (external systems)

4. Year 2000 Approach

Methods: expansion, windowing, encoding
Data Access: internal storage, external display (screens and reports)
Processes: sorting
Data Exchange Agreements: definition of data exchanges, bridges, and list of agreements
Explain prioritization of components: e.g., critical vs non-critical, processing frequency, batch/online

5. Deliverables

software, conversions, documentation, training

6. Development Considerations

assumptions, dependencies, restrictions, system development risk areas, major development activities

7. Work Breakdown Structure

task list

8. Schedule

due dates for deliverables and milestones
At a minimum, five phases: Awareness, Analysis/Assessment, Development/Renovation, Validation/Testing, and Implementation
Schedules should be at a level of sufficient granularity to track progress effectively in one month intervals.

9. Organization and Resources

staffing plan, organizational structure, group interfaces, equipment, training, support functions

10. Management Considerations

requirements management, project risk management, progress reporting, issues management, contingency plan

11. Appendices

security considerations, hardware plan

TEST PLAN GUIDELINES - YEAR 2000 MODIFICATION

There will be individual test plans for Unit, Integration, and Systems Testing.

Each section of the test plan should describe the information as specified. Additional sections may be included immediately prior to section 19, Approvals. The actual documentation to support section 10, Test Deliverables, should be compiled and submitted under separate cover. Submitted test plans will be reviewed. At a minimum, a comprehensive test plan should include the following sections:

1. Test Plan Identifier

unique identifier for this test plan, include testing level: unit, integration, or systems

2. Introduction

purpose
ID of system and summary of software items and features to be tested

3. Entry / Exit Criteria

identification of entry criteria in this testing level, exit criteria to mark that this level is complete
determination of criteria satisfaction

4. Test Items

identify test items including version/revision level
specify transmittal media descriptions which impact hardware requirements
indicate need for logical/physical transformations before testing can begin
reference incident reports relating to test items

5. Features To Be Tested

identify all software features and combinations of features to be tested with associated test design specification

6. Features Not To Be Tested

identify all software features and combinations of features not to be tested and the reasons

7. Approach

describe overall approach to testing
specify approach for each entry in 5. above
specify major activities, techniques, and tools for each entry in 5. above
specify minimum comprehensiveness desired and techniques to judge minimum
specify any additional completion criteria
identify significant constraints on testing

8. Item Pass/Fail Criteria

specify criteria to determine each test item passed/failed

9. Suspension Criteria and Resumption Requirements

specify criteria used to suspend all or a portion of testing on a test item
specify testing to be repeated upon resumption

10. Test Deliverables

These deliverables will be developed separately and be provided as they are completed.
As a minimum, the following deliverables will be required to ensure Year 2000 compliance:

Test Designs

Each test design should specify the details of the approach for a specific test or tests.

Test Cases

Each test case shall contain a set of test inputs, execution conditions, and expected results associated with a particular test objective such as to verify compliance with a specific requirement (i.e., a date comparison to verify the attainment of the payment floor). Each test case shall be associated with a test design. Generally many test cases are associated with a single test design.

Test Results Documentation

Test Log

A chronological record of the execution of all tests. Relevant detail shall be included such as test objective, the associated test design, whether the test passed or failed, etc.

Test Summary Reports

Each test summary report shall summarize testing activities and results. Summary reports shall include metrics and provide an overall evaluation of the test(s).

Test Incident Reports

A test incident report shall be prepared for each event that occurred during testing, such as an exposed software fault, which requires further investigation.

11. Testing Tasks

identify tasks necessary to prepare for and perform testing
identify all intertask dependencies and any special skills required

12. Traceability Matrix

maps requirements and functional specifications, if applicable, to one or more test

cases

13. Reference Documents

number, title, revision and date of all documents referenced
provide references to requirements specification, design specification, users guide, operations guide, installation guide, if they exist

14. Environmental Needs

specify both necessary and desired properties of test environment including hardware, communications and system software, mode of usage (e.g., standalone), other software or supplies to support the test
specify level of security which must be provided
identify special test tools needed
identify source of all needs not currently available to test group

15. Responsibilities

identify groups responsible for managing, designing, preparing, executing, witnessing, checking, and resolving
identify groups responsible for providing the test items and the test environmental needs

16. Staffing and Training Needs

specify test staffing needs by skill level
identify training options for providing necessary skills

17. Schedule

include test milestones as well as transmittal events
define additional test milestones needed
estimate time required to do each testing task
specify schedule for each testing task and test milestone
for each testing resource, specify its period of use

18. Risks and Contingencies

identify high-risk assumptions of the test plan
specify contingency plans for each assumption

19. Approvals

specify names and titles of all persons who must approve this plan
provide space for signatures and dates

20. Appendices

MINIMUM REQUIREMENTS FOR TEST CASE DESCRIPTIONS

At a minimum, there must be test case descriptions to address the following Y2K sensitive areas:

YEAR 2000:
Correct recognition and processing of dates from 01/01/1900 to 12/31/1999
Correct recognition and processing of dates equal to and beyond 01/01/2000
Correct processing of dates across the century boundary (mix 1900's and 2000's)
Correct processing of dates from 1999 into 2000 (crosses 1999 to 2000 successfully)
Correct processing of functions and events that occur cyclically (weekly, monthly, etc.)

LEAP YEAR:
12/31/1999 is the 365th day of the year 1999
The year 2000 is identified as a leap year
02/29/2000 is recognized as a valid date, and is the 60th day of the year
03/01/2000 is recognized as a valid date, and is the 61st day of the year
12/31/2000 is the 366th day of the year 2000

DATE FIELD SIZE and TYPE:
A) All year data field sizes = 4 digits
-OR-
B) Some or all year data field sizes = 2 digits

If B, correct determination of the century

EMBEDDED DATE FIELDS:
Correct recognition and processing of dates embedded within other data fields

HARD CODED DATES:
Complete identification of all hard coded date fields
Correct processing of all hard coded date fields, including special value indicators

COMPARISON and SORT OPERATIONS:
Correct recognition and sorting of dates before and after century boundary

INTERFACING SYSTEMS:
Correct recognition and processing of dates exchanged between other internal, external, or COTS systems

SPECIAL CASE USAGE:
Verification of date field values such as: “99", “09", “00", “09/09/99", “99/09/09", “9/9/99" to indicate limitations or conditions other than date